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Beyond Scavenger Hunts and Guided Expeditions: Rethinking Interdisciplinary Majors and 21st Century Liberal Education

by

Renee A. Monson
(Corresponding author)
Department of Sociology
Hobart and William Smith Colleges

and

Kristy L. Kenyon
Department of Biology
Hobart and William Smith Colleges

***Abstract**:* Interdisciplinary undergraduate programs have grown dramatically in recent decades, but they are vulnerable to cuts given various stakeholders' calls for greater accountability in higher education. Assessing the outcomes of interdisciplinary majors presents an array of challenges, including how to describe and categorize patterned variation in the place and purpose of disciplines in interdisciplinary programs. Knight, Lattuca, Kimball, and Reason's (2013) typology conceptualizes this variation in terms of curricular features and staffing of interdisciplinary programs, and asserts that stronger programs are marked by less reliance on disciplinary courses and faculty whose lines are in disciplinary departments. We argue that another important source of variation is the approach taken to interdisciplinary education: how the program connects disciplines (e.g., via integration or juxtaposition) and what the program aims to foster (depth, breadth, or specific skills). Attending to these aspects of variation in interdisciplinary programs improves the Knight et al. framework insofar as it permits investigation of which combinations of interdisciplinary approaches, curricular design, and staffing might best foster particular educational aims. We demonstrate the utility of this improved framework by applying it to a recently completed external review of an interdisciplinary program at a liberal arts college (ours). We offer some suggestions for how to align different approaches to interdisciplinary education with an institution's general curriculum, the major's curriculum, and program staffing.

Keywords: interdisciplinary, curriculum, major, disciplines, multidisciplinary, liberal education

Interdisciplinary Programs' Growth and Vulnerability

Interdisciplinary undergraduate majors have increased dramatically in the U.S. over the last several decades. The number of degree-granting interdisciplinary programs in American colleges and universities grew by nearly 250% between 1975 and 2000, far exceeding the 18% rate of growth in undergraduate enrollment during the same period[1] (Brint, Turk-Bicakci, Proctor, & Murphy, 2009). Tracking change over time in the number of undergraduate degrees that are actually awarded in interdisciplinary fields is difficult due to the complexities[2] and shifts over time in the NCES classification systems (Brint, Riddle, Turk-Bicakci, & Levy, 2005). Nonetheless, undergraduate degrees in interdisciplinary fields appear to be increasing (Brint et al., 2005; Brint, Proctor, Mulligan, Rotondi, & Hanneman, 2012; Holley, 2009b), and liberal arts institutions may be particularly affected by these trends, since interdisciplinary programs are especially likely to have increased at institutions "that award most of their undergraduate degrees in arts and sciences" rather than in vocational-occupational fields (Brint et al., 2009, p. 175).

The rise of interdisciplinary programs and degrees is traced to multiple sources. Students may believe that interdisciplinary majors are more directly applicable to future jobs; faculty may find interdisciplinary teaching enlivening, perhaps as a relief from hyper-specialized graduate training; and

[1] Brint et al. (2009) utilized the College Catalog Study database, which includes catalogs for a stratified random sample of comprehensive four-year institutions in the U.S. For Brint et al. (2009, pp. 160-161) a field of study was "typically organized as an interdisciplinary program" if at least two-thirds of the time the field drew on faculty from more than one academic department and was identified by the institution as either interdisciplinary, multidisciplinary, trans-disciplinary, interdepartmental, or cross-departmental. Approximately forty fields were coded as typically organized as interdisciplinary programs, including non-Western cultural studies, race and ethnic studies, Western studies, environmental studies, international studies, urban studies, public policy studies, women's studies, American studies, several biomedical fields, and so on. For the full list, see Brint et al. (2009, Table 2, pp. 164-165).

[2] The National Center for Education Statistics (NCES) administers an annual survey (IPEDS) of institutions of higher education to track undergraduate degrees awarded in particular fields of study. The fields can be aggregated at a variety of levels, one of which classifies baccalaureate degrees as in either "arts and sciences" fields or "professions" fields, and interdisciplinary degrees appear in both of these categories. See http://carnegieclassifications.iu.edu/classification_descriptions/ugrad_program.php.

both may find interdisciplinarity more aligned with their interests in social change (Bender, 2013; Brint et al., 2009; Grubb & Lazerson, 2005; Klein, 2009). Another important source of growth in interdisciplinary degrees is the belief that interdisciplinary study may contribute more effectively than disciplinary study to students' engagement, critical and analytical skills, creative thinking, and the like (Holley, 2009b; Newell, 1998, 2007; on the prevalence of these views among college administrators at liberal arts institutions, see Rhoten, Boix Mansilla, Chun, & Klein, 2006).

Despite this growth, some analysts remain concerned about interdisciplinary programs' vulnerability in the broader landscape of 21st century liberal education, which includes changes in the size and characteristics of the applicant pool, widespread financial constraints, various stakeholders' calls for greater accountability in higher education, and interdisciplinary programs' uneven institutionalization (Augsburg, 2006; Henry, 2005; Klein 2013). Because empirical evidence of the impacts of interdisciplinary study on student outcomes has been somewhat "sparse" (Lattuca, Voigt, & Fath, 2004, p. 24), some have called for more research on the effectiveness of interdisciplinary study as one of several strategies for assuring these programs' stability (Augsburg, 2006).

Challenges in Assessing Interdisciplinary Programs and Majors

Assessments of interdisciplinary courses are now common in the scholarship on teaching and learning (SoTL), and research on best practices for assessing the student outcomes associated with interdisciplinary tasks and interdisciplinary learning communities has appeared (Boix Mansilla & Duraising, 2007; Carmichael & LaPierre, 2014; Gouvea, Sawtelle, Geller, & Turpen, 2013). Evaluations of interdisciplinary programs and majors are less commonly published in the SoTL literature, although institutions routinely conduct assessments as part of accreditation processes (Brooks & Widders, 2012; Tight, 2012). Yet, significant challenges confront those attempting to evaluate the efficacy of interdisciplinary education. Articulating the primary aims of the interdisciplinary major is critical and depends, in turn, on what variety of "interdisciplinarity" is pursued.

Articulating the Aims of Interdisciplinary Majors: Skills, Breadth, Depth?

The aims (or expected student outcomes) of interdisciplinary study are frequently understood as skills or cognitive abilities rather than content knowledge (Repko, 2008), and the challenges associated with measuring

these outcomes are well documented. There are questions of conceptualization (e.g., what is critical thinking), operationalization (e.g., what is an indicator of critical thinking), research design (e.g., pre- and post-tests or one-shot case study, and how to untangle the outcomes associated with what is taught from those associated with how it is taught), units of analysis (are interdisciplinary learning outcomes best understood as demonstrable by individual students or by groups of students' interactions), and temporality (can these outcomes be captured immediately following the interdisciplinary learning experience, or do they only emerge after some time) (Boix Mansilla & Duraising, 2007; Brooks & Widders, 2012; Newell, 1994; Rhoten et al., 2006). These challenges are relevant to the assessment of interdisciplinary learning experiences at all levels: tasks, courses, or majors.

But the assessment of interdisciplinary majors raises the additional question of whether the major's expected outcomes include depth of knowledge and/or breadth of knowledge. Depth and breadth have been the primary aims of liberal education since the early 20th century (Schmidt, 1957). Traditionally, depth has been achieved through the major (the extensive study of a single discipline) and breadth is assured through a general education curriculum (a specific set of core courses or distribution requirements across disciplines) (Rudolph, 1977). Interdisciplinary *courses* are now commonly included in general education curricula (Johnson, Ratcliff, & Gaff, 2004) and are widely viewed as contributing to students' breadth of knowledge. What is less clear is whether interdisciplinary *majors* aim to foster breadth of knowledge, depth of knowledge, both, or neither in the context of a liberal education.

Rhoten et al. (2006, p. 11) surveyed 109 liberal arts institutions and found that several skills and capacities were highly expected outcomes of interdisciplinary education (but not of disciplinary education), including creative thinking, the integration of diverse knowledge, and "multidisciplinary breadth of knowledge." Table 1 shows that the only student outcome highly expected of disciplinary education (and not highly expected of interdisciplinary education) was "disciplinary depth of knowledge." It is striking that nowhere on the list of expected outcomes does the concept of "*inter*disciplinary *depth*" appear. This is consistent with the view that interdisciplinary learning fosters students' skills and cognitive abilities more than their content knowledge. Can interdisciplinary majors foster depth of knowledge, and how is that defined and demonstrated? Do some interdisciplinary majors do this, but not others? If the consensus view is that interdisciplinary majors do not foster students' depth of knowledge, but yet interdisciplinary degrees have increased substantially since the latter part of the 20th century, it is not clear whether depth remains a primary aim

of 21st century liberal education.

Table 1: Student outcomes highly expected* of interdisciplinary education, disciplinary education, both, and neither (adapted from Rhoten et al., 2006, p. 10)

Interdisciplinary education only	Disciplinary education only	Both interdisciplinary and disciplinary education	Neither interdisciplinary nor disciplinary education
Multidisciplinary breadth Holistic thinking Creative thinking Awareness of diverse knowledge Integration of diverse knowledge Appreciation for diverse peoples Personal empowerment	Disciplinary depth	Critical thinking Problem solving Analytical skills Tolerance for ambiguity/ complexity Appreciation for diverse ideas	Civic engagement

*Outcomes designated as "highly expected" by 40% or more of sample of 109 liberal arts institutions.

Defining "Interdisciplinary" Majors: Implications for Programs' Educational Aims

The debates about how to define "interdisciplinary" are well known, and often center on whether multidisciplinarity is understood as part of, or in contradistinction to, interdisciplinarity. Rhoten et al. (2006, p. 2) usefully distinguish between the "'big tent' (i.e., comprehensive)" meaning of interdisciplinarity, which encompasses several subtypes, each with a different sort of interaction among disciplines, and the "small tent" meaning of interdisciplinarity, in which it is "just one of many distinct ways of bringing together disciplines." Klein's (2009) "small tent" definition of interdisciplinarity (which "*integrates* content, data, methods, tools, concepts, and theories from two or more disciplines or bodies of specialized knowledge") demarcates it as distinct from both multidisciplinarity (which "*juxtaposes* disciplinary perspectives....[treating them] as separate voices in encyclopedic alignment") and transdisciplinarity (which creates "comprehensive frameworks that *transcend* the narrow scope of disciplinary

worldviews") (pp. 181-182, emphasis added; see also Klein & Newell, 1997). In contrast, Lattuca's (2001, p. 78) "big tent" definition of interdisciplinarity centers on the interaction, not necessarily integration, of disciplines. Lattuca (2001, pp. 79-118) describes several subtypes of interdisciplinarity, including synthetic interdisciplinarity (which links or bridges two or more disciplines, while retaining their discrete contours) and conceptual interdisciplinarity (which removes inquiry from any disciplinary basis, often implying a critique of disciplinary approaches). Lattuca's (2001) definition of informed disciplinarity (which illuminates a particular discipline by using concepts or findings from other disciplines) has some similarities to Klein's (2009) definition of multidisciplinarity; significantly, Lattuca places informed disciplinarity within the "big tent" of interdisciplinarity.

Davies and Devlin's (2010) "midsize tent" definition of interdisciplinarity(ies) is further evidence that the meanings and relationship of interdisciplinarity and multidisciplinarity are contested. Like Lattuca (2001), Davies and Devlin (2010, pp. 12-19) describe several different variants inside the interdisciplinary tent that exist on a continuum, including relational interdisciplinarity (the most minimal or "benign" variant) and transdisciplinarity (the most "radical" variant). Like Klein (2009), Davies and Devlin (2010, p. 11) place multidisciplinarity outside the interdisciplinary tent, but their definition of it describes an even more minimal relationship among disciplines: "simply the co-existence of a number of disciplines." And Klein's (2009) definition of multidisciplinarity is similar to Davies and Devlin's (2010, p. 12) definition of relational interdisciplinarity ("elective subjects taken from a variety of disciplines that in some way relate to a general topic .... looking at an issue from different disciplinary perspectives, with little or no attempt to integrate those perspectives") which Davies and Devlin place *inside* their "midsize" interdisciplinary tent.

The "small tent" definition of *inter*disciplinarity as distinct from *multi*disciplinarity can be read as implying that some forms of interaction among disciplines are not real/true forms of interdisciplinarity (Lattuca, 2001, p. 115), and thus that the effectiveness of interdisciplinary programs can be assessed in part by examining the extent to which the degree requirements create explicit opportunities for students to integrate disciplines, rather than (merely) juxtapose them. But the "big/midsize tent" definitions of *inter*disciplinarity (crossing or moving among disciplines) seem to distinguish it from *intra*disciplinarity (remaining within a discipline) rather than *multi*disciplinarity, at least as multidisciplinarity was defined by Klein (2009). Thus, interdisciplinary majors should be assessed according to whether the curriculum creates opportunities for students to juxtapose,

critically examine, *or* integrate disciplines, since all of these forms of interaction are simply different kinds of "not-*intra*disciplinarity" and there is no a priori logic to rank ordering them.

We think it is more appropriate to assess interdisciplinary programs by examining, rather than assuming, which varieties of "interdisciplinarity" are more effective in fostering particular educational aims (developing different sets of skills and cognitive abilities, promoting breadth and/or depth of knowledge). Moreover, it seems likely that different interdisciplinary programs may well have different educational aims, due to the enormous diversity of content areas across interdisciplinary programs (Brint et al., 2009), which in turn are characterized by disparate intellectual projects, pedagogies, and histories of incorporation into American higher education (Engerman, 2015; Holley, 2009b; Klein, 2013; Wilson, 1999).

Classifying Interdisciplinary Programs: Variation in the Place and Purpose of Disciplines

An initial task in the assessment process, then, is to develop a systematic way to chart the extraordinarily diverse landscape of interdisciplinary programs. Henry (2005) described twenty characteristics of (and positive student outcomes associated with) "high quality" interdisciplinary programs, but it is not clear how many interdisciplinary programs actually fit this "ideal type." Assessing the effectiveness of interdisciplinary programs requires the development of conceptual tools for describing patterned variation in interdisciplinary programs' organizational structure, curricula, and aims, in order to better understand what different sorts of interdisciplinary majors may contribute to the expected student outcomes.

The Knight et al. Typology

Knight, Lattuca, Kimball, and Reason's (2013) development of one such typology centered on the fact that degree-granting interdisciplinary fields are commonly organized as trans-departmental units in American colleges and universities, and thus most rely to some extent on faculty from a variety of discipline-based departments to staff their curricula. Following Augsburg and Henry (2009) and Klein (2009), Knight et al. (2013, p. 149) included four criteria in their typology of interdisciplinary programs' organizational and curricular strength: the number of credits required for the interdisciplinary degree expressed as a percentage of total credits required for graduation; the percentage of degree credits that were required to be taken within

the interdisciplinary program; the percentage of faculty members whose appointment was within the program; and whether the program director's appointment was within the program. Knight et al. (2013) collected data on these measures from the websites of 408 interdisciplinary programs[3] at 37 undergraduate liberal arts institutions, and cluster analysis confirmed the existence of six distinct groupings of these four organizational and curricular features.

Knight et al. (2013) found that in more than half of the surveyed programs the majority of the affiliated faculty had appointments outside the interdisciplinary program, and most programs relied primarily on menus of disciplinary courses outside the program for their curricula (in fact, nearly one in four programs' requirements could be met without taking any courses within the interdisciplinary program). Only 17% of the surveyed programs met all four of Knight et al.'s criteria of organizational and curricular strength; these programs were classified as the "strongest" of the six types of programs. More than one in five of the surveyed programs (21%) exhibited none of these four criteria, and were classified as the "weakest" type (Knight et al., 2013, p. 155).

These configurations of organizational and curricular features are of interest because of their hypothesized impact on students' experiences and learning outcomes. The typology assumes that the percentage of program faculty whose lines are in the program is an indicator of an institution's support for interdisciplinary education and/or the degree of cohesion among program faculty, which may affect curricular decision-making and thus students' learning (Knight et al., 2013, p. 147). The typology also assumes that the percentage of degree credits required to be taken within the interdisciplinary program (rather than in other, usually disciplinary, departments) is an indicator of the extent to which students are required to integrate disciplines as they pursue interdisciplinary understanding (Knight et al. 2013, p. 147; see also Augsburg & Henry, 2009; Holley, 2009b; Klein, 2009), further assuming that the intellectual work involved in disciplinary integration is the mechanism by which many positive student outcomes are fostered (Boix Mansilla & Duraising, 2007; Lattuca, Voigt, & Fath, 2004), and that more disciplinary integration yields better student outcomes (Boix Mansilla & Duraising, 2007, p. 229). Finally, the typology privileges prospective (intentional and contemporaneous) integration over retrospective (post hoc) integration (see Newell, Hall, Hutkins, Larner, McGuckin, & Oates, 2003, p. 12). As Knight et al. (2013, p. 147) put it, "strong interdisciplinary programs stress the [explicit] integration of knowledge, whereas weak programs ask students to choose from a menu of courses that are not intentionally

[3] Knight et al. (2013, Table 2, p. 149) relied on the list of fields typically organized as interdisciplinary programs developed by Brint et al. (2009). See footnote 1, above.

integrated....[instead] integration is...left primarily to the student."

Different metaphors for intellectual journeys usefully capture the key distinctions between Knight et al.'s "strong" and "weak" interdisciplinary programs. In "weak" programs, a student's experience of the major may resemble a scavenger hunt. The interdisciplinary program posts a list of mainly disciplinary courses that all "have something to do with ____ [e.g., the environment, or public policy, or media]." As students crisscross the campus over their four years, they periodically find (enroll in) one of these courses; after carrying it around for a term, they throw it in their backpack. As the courses gradually accumulate students complete the scavenger hunt (major). In contrast, a "strong" undergraduate program will have a more structured curriculum (e.g., with a set of required core interdisciplinary courses) that makes students' experience of the interdisciplinary major more like a guided expedition than a solitary scavenger hunt. Faculty with lines in the interdisciplinary program direct or steer students along a path or through a terrain to the destination(s), for example, a capstone course.

Proposed Additional Criteria for the Knight et al. Typology

A comparison of two recent case studies of interdisciplinary programs that fit Knight et al.'s criteria for relatively "strong" programs (Haynes & Leonard, 2010; MacPherson, 2015) suggests two additional criteria that usefully could be included in their typology of variation in interdisciplinary programs: the sequencing and prerequisite structure of disciplinary versus interdisciplinary courses; and which variant of interdisciplinary education the program pursues.

First, these two case studies indicate heterogeneity among "strong" interdisciplinary programs in how disciplinary and interdisciplinary courses are sequenced, which in turn affects students' experiences and learning outcomes (see Bender, 2013; Davies & Devlin, 2010). Haynes and Leonard's (2010) longitudinal study examined ten students' experiences with an interdisciplinary major, commenced in the students' first year, that included several required interdisciplinary courses taught by faculty with various disciplinary backgrounds but whose appointments were in the interdisciplinary program. Haynes and Leonard (2010) found evidence of students' intellectual development over time in this program. Although most first-year students were excited about their learning experiences, most also felt "daunted" by the multiple perspectives presented in the required interdisciplinary courses (Haynes & Leonard, 2010, p. 652; see also Krometis, Clark, Gonzalez, & Leslie, 2011). By their second and third year,

students reported feelings of intellectual uncertainty and instability as they began taking more disciplinary courses for their interdisciplinary majors, but this was accompanied by a nascent sense of clarity about the meaning and utility of an interdisciplinary perspective.

In contrast, MacPherson (2015) described some problems of an interdisciplinary program with two required core courses (introduction and capstone), several required foreign language courses, and several faculty lines housed within the program. Although menus of disciplinary electives comprised only one-third of the courses for the major, because the introductory course was not a prerequisite (in fact, it could be taken in the same term as the capstone) students often declared the major late in their undergraduate career after accumulating a number of credits in cross-listed disciplinary courses and/or after a term studying abroad, without having had reason or opportunity to integrate their learning in those courses. Program faculty observed that students were often ill equipped to complete the capstone course (MacPherson, 2015, p. 41).

In both of these case studies the authors' proposed remedies for students' struggles included more explicit opportunities for students to grapple with disciplines in the context of interdisciplinary study. But these remedies were framed in different ways, suggesting another potentially important type of heterogeneity within "strong" programs: the variety of interdisciplinarity the program pursued. For example, Haynes and Leonard offered several possible remedies, including:

> *scaffolding* activities and assignments to prompt students to gain disciplinary knowledge *and then* interdisciplinary understanding....offering students concrete strategies for *integrating* knowledge...promoting *comparative analysis* of disciplinary thinking; and sharing diverse models of *integrative* work. (2010, p. 662, emphasis added)

Haynes and Leonard's proposed improvements emphasized explicit and intentional integration of disciplines, consistent with a "small tent" definition of interdisciplinarity. In contrast, the language MacPherson (2015) used to describe the 200-level required core course she and her colleagues developed to address their students' struggles omits any reference to disciplinary integration:

> [T]he first class [is devoted] to reviewing the general characteristics of a discipline and the differences between disciplinary, multidisciplinary, and interdisciplinary perspectives... During the subsequent weeks of the semester...professors visit class to articulate the inner

> workings of *their individual disciplines*...[stripping] disciplines to their basic premises, rather than focusing on content....While hearing professors talk about *disciplines as disciplines*, and thereby *distinguishing and connecting* fields of study, students develop *tools to frame questions* about a single topic from a *variety* of disciplinary and interdisciplinary perspectives. (MacPherson, 2015, p. 42, emphasis added)

The emphasis on "disciplines as disciplines" and "distinguishing and connecting fields of study" suggests that MacPherson's program included elements of relational interdisciplinarity ("looking at an issue from different disciplinary perspectives with little or no attempt to integrate those perspectives" [Davies & Devlin, 2010, p. 12]) and/or synthetic interdisciplinarity (linking or bridging two or more disciplines, while retaining their discrete contours [Lattuca, 2001]). As we discussed above, these approaches are outside the "small tent" definition of interdisciplinarity (Klein, 2009).

We argue, therefore, that interdisciplinary programs classified as relatively "strong" according to Knight et al.'s (2013) criteria can be heterogeneous in the variety of interdisciplinarity they pursue. But Knight et al.'s (2013) typology does not differentiate programs according to the variety of interdisciplinarity they pursue; instead, it assumes that the presence of required courses within the interdisciplinary program is an indicator of "small tent" interdisciplinarity, which emphasizes the explicit integration of disciplines. We suggest that the typology's usefulness would be improved by leaving open the possibility of, rather than assuming, correlation between a program's organizational and curricular features and the variant of interdisciplinarity it pursues, in order to investigate which of these variables are associated with particular student learning experiences and outcomes.

In sum, we argue that assessing – and improving – interdisciplinary majors' contributions to the particular aims of 21st century liberal education requires attention to variation in interdisciplinary programs' relationship to disciplines in several ways: their organizational structure, particularly the number of faculty appointments within the program; their curricular features, including the ratio and sequencing of disciplinary and interdisciplinary courses; and the variety of interdisciplinarity they pursue (the "small tent" variety or one of the "big/midsize" tent varieties). This framework can be used in future research to look for patterns in how varieties of interdisciplinarity, curricular features, and organizational structures are combined, and investigate which of these factors may be most important to programs' impacts on student

outcomes. The framework also can be used by interdisciplinary program faculty to reflect on whether and how to re-align their program's variety of interdisciplinarity, curriculum, and organizational structure so as to improve student outcomes.

Applying the Modified Framework to an Interdisciplinary Program

We now describe one interdisciplinary program at our small liberal arts institution, Hobart and William Smith Colleges (H&WS), that underwent an external review in 2014,[4] and examine the evaluations and recommendations made in that review in light of the criteria discussed above: the program's organizational and curricular structure, the evidence of student learning experiences, and the program's variety of interdisciplinarity and educational aims.

An Interdisciplinary Program: Organizational and Curricular Structure

The Public Policy (PPOL) major at H&WS was created in response to the adoption of a new general curriculum in the fall of 1996 that required all students to complete both a major and minor (or two majors), one of which had to be disciplinary and one of which had to be interdisciplinary. As part of this new general curriculum, the number of interdisciplinary majors offered at H&WS grew from two in 1995-96 to 14 in 1998-2000. PPOL was one of those new interdisciplinary majors, created by a group of faculty occupying lines in ten different disciplinary departments. The PPOL program had a somewhat informal governance structure until 2005, when the line of a tenured faculty member who had been involved in PPOL's creation was moved into the PPOL program from a disciplinary department, and a steering committee was formed. The PPOL steering committee included this faculty member and more than a dozen other faculty from the humanities, social sciences, and natural sciences divisions.[5] The steering committee faculty were responsible for advising students, teaching courses in which

[4] Both of the authors participated in the preparation of the self-study report for the external review, and had by that time served for a decade or more on the steering committee.

[5] In 2014, the disciplinary backgrounds of the PPOL steering committee faculty included anthropology, biology, chemistry, economics, education, philosophy, political science, and sociology. In 2006, a faculty member trained in psychology also was on the steering committee.

students could complete the capstone requirement, and supervising majors' internships, independent studies, and honors projects. Curricular decisions were made by the entire steering committee (subject to the approval of H&WS' Committee on Academic Affairs). The faculty member occupying the sole line in PPOL served as the program coordinator,[6] but during sabbaticals, this administrative duty occasionally rotated to other faculty members on the steering committee. The PPOL program coordinator was compensated with a small stipend but no course release.

In 2013-14, the PPOL major required 10 courses in four different categories (three core, two skills, four concentration, and one capstone in which the student wrote a policy brief paper), but no particular course was required of all PPOL majors; instead, there was a lengthy menu of pre-approved (and almost exclusively disciplinary) courses to choose from in each of these categories. The three "core" courses were not core to the PPOL program, but were "foundational" introductory courses, one from each of the three divisions of the curriculum. Nearly all courses taken for PPOL credit were cross-listed offerings taught by dozens of faculty members in 18 different departments and programs; a significant proportion of these cross-listed courses were not taught by the faculty on the PPOL steering committee. So many different courses were cross-listed with PPOL that students often declared the PPOL major late in their third or even fourth year when they discovered that they already had taken many courses that would "count" towards PPOL. PPOL was the eighth most common major among graduating seniors in 2013-14.

The H&WS PPOL program was among those included in Knight et al.'s (2013) study, and they placed its curricular structure in the weakest of their categories (personal communication with David B. Knight, July 8, 2015). PPOL's organizational structure varied (as noted above, the role of program coordinator occasionally rotated away from the PPOL faculty member to other steering committee faculty), but it was categorized as at least somewhat weak because the lines of all but one of the faculty affiliated

[6] At H&WS most interdisciplinary programs are not organized as departments. The role of the PPOL program coordinator was to convene meetings of the affiliated faculty, oversee course scheduling and staffing, process budget requests, oversee vetting of syllabi for courses to be added to the list of pre-approved courses, update the online and print catalog copy for the program description and requirements, sign off on students' major and minor declaration forms, respond to students' petitions for exceptions and substitutions to the major/minor requirements, liaise with various administrative offices (e.g., the Office of Admissions, the Office of the Registrar), and the like. Typically the program coordinator also shouldered a large share of the student advising load.

with PPOL were in disciplinary departments.

Evaluation of Student Learning Experiences for PPOL Majors[7]

In 2013-14, PPOL collected evidence of self-reported student learning outcomes[8] in preparation for its first external review. All junior and senior PPOL majors with a GPA of 2.75 and above (on a 4-point scale) were invited to participate in a focus group to discuss the strengths and weaknesses of the PPOL major. The focus group was facilitated by two staff members at our institution's Center for Teaching and Learning (no PPOL faculty were present). Fifteen students[9] participated in the focus group and completed an anonymous online questionnaire prior to the discussion.

During the focus group discussion, the students were asked whether they felt prepared to write a policy brief in their capstone course. We reviewed the facilitators' summaries and found several themes in student responses, including a perceived lack of structure, support, practice, and models for writing policy briefs. Moreover, they expressed a perceived disconnect between the policy brief/capstone course and other coursework in the PPOL major. This is consistent with the students' responses to one of the open-ended questions on the online survey that asked, "At this point, what skills have you developed through the PPOL major?" None of the responses suggest the students thought they had developed the ability to *"integrate* content, data, methods, tools, concepts, and theories from two or more disciplines" that Klein (2009, p. 181) placed at the center of interdisciplinary studies. Two students commented that they were unsure of *any* skills they had acquired, and one of them explicitly tied this to PPOL's loose curricular structure:

[7] We received permission from the Institutional Review Board at our institution to use the PPOL self-study data in this research.

[8] We had limited direct evidence of students' learning outcomes. In 2005-06 three PPOLfaculty (including the two authors) separately read a randomly selected subset of student policy briefs written in capstone courses. We evaluated the policy briefs according to the same set of six criteria: clear executive summary; clear statement of the public policy problem; clear discussion of the history of the public policy problem; theoretical and empirical literature from at least two different relevant disciplines; clear presentation of the principal alternative policy proposals; clear explanation and argument for the preferred policy solution. This exercise revealed some disagreement about how to apply the criteria, but we agreed that the quality of the briefs was, at best, very uneven.

[9] We cannot generalize the comments of these 15 students to all 98 PPOL majors, but because respondents were solicited only from those who had at least a B- average, these are the students we logically could have expected to be most able to articulate how or if they integrated the different tools, methods, and concepts of different disciplines and applied them to public policy questions.

"Not many [skills]. I am having trouble making the policy connections between the courses. They just seem random to me."

However, half of the students responding to the question about skill development said that the PPOL major had contributed to their general skills in reading, critical thinking, and/or analytic writing; three students indicated that the PPOL major had contributed to their ability to address issues from multiple perspectives; three said that it had increased their content knowledge regarding public policy (policy-making, policy implementation, and/or policy evaluation); and four said that it had increased their awareness of social justice issues.

A second open-ended question from that online questionnaire asked, "Why did you choose Public Policy as a major?" About half of the students said that it was because of the "huge variety" of disciplinary courses offered, suggesting that the major's lengthy "a la carte menus" of courses in different disciplines was an important reason for its popularity among students. About half also said that they found the subject personally interesting and/or that it was relevant to their employment aspirations. Only one student referenced the integrative potential of PPOL as a reason for majoring in it: "I thought it would ... allow me to apply skills/principles I learned in both Econ and Env [Environmental Studies] classes."

In sum, the data on PPOL majors' learning outcomes support our suggestion that students typically experience "weak" interdisciplinary programs like PPOL as a "scavenger hunt" rather than a "guided expedition." Many students wanted more of a "guided expedition" experience, particularly when preparing for the capstone requirement of the policy brief. But some students valued the customizability and wide-ranging terrain of the major requirements, a key aspect of the "scavenger hunt" experience of the PPOL major.

The PPOL Major's Variety of Interdisciplinarity and Educational Aims

In the years that the authors served on the PPOL steering committee we cannot recall any discussion that explicitly focused on which variety of interdisciplinarity we intended the program to pursue. This is consistent with Knight et al.'s (2013, p. 145) observation that "in practice, most faculty members are either unaware of or unconcerned with such distinctions." This did not bode well for the program's external review, since if "programs claiming to be interdisciplinary are fuzzy in their understanding of what interdisciplinarity is, then their curriculum will not provide the...educational outcomes for students that interdisciplinarity promises" (Repko, 2007, p. 130). Still, some indications of the PPOL program's implicit variety of

interdisciplinarity are found in the 2012-14 catalog description of the PPOL program, and in a list of learning objectives for the major.[10]

The program description refers to several of the skills and capacities that commonly appear in lists of possible outcomes of liberal education, including critical thinking, problem solving, analytical skills, and civic engagement:

> The public policy program connects classroom learning to efforts through public policy to *solve problems* in the larger society, teaching *analytic skills* within an interdisciplinary, liberal arts context. Its goal is that graduates *think and act critically in public affairs*. Students explore the methodological, *analytical*, empirical, and *ethical issues* of policy formulation and implementation. Public Policy is designed to prepare students for *careers in government*, human services, social work, *urban affairs, city planning*, law, *community organizing*, business, communications, or academia. (Hobart and William Smith Colleges Catalogue, 2012-14, p. 307, emphasis added)

The program's list of learning objectives included the following:

- Students should be *exposed to various disciplinary approaches* (reflecting the sciences, social sciences, and humanities) to the study of public policy problems...;
- Students should be able to interpret how issues of... inequality...and difference...are reflected in the public policy process and public policy outcomes. They should be able to *understand various approaches and perspectives* in tackling such complicated issues...;
- Students should be able to *distinguish among various methodological approaches* to conducting public policy research (e.g. quantitative and qualitative)... [emphasis added]

The phrasing of these learning objectives – with its references to "various approaches" and "exposure" to different disciplines, and lack of references to integration of disciplinary content, tools, or methods – suggests that faculty designing the PPOL program pursued a "midsize tent" version of interdisciplinarity, similar to the variant Davies and Devlin (2010, p. 12) identified as the most minimal: relational interdisciplinarity ("looking at

[10] These learning objectives were initially created in 2005-06 by members of the faculty steering committee as part of an institution-wide assessment initiative.

an issue from different disciplinary perspectives, with little or no attempt to integrate those perspectives"). The learning objectives and the program description together suggest that the curriculum was intended to foster breadth of knowledge and several attendant skills, not depth.

External Reviewers' Critiques and Recommendations for the PPOL Program

The external reviewers of the PPOL program identified some strengths of the program and major, including "the rich interdisciplinary soil provided by [H&WS] .... [which] has made a unique commitment to interdisciplinary study" (Taylor & Wyckoff, 2014, p. 2). The reviewers commented that the breadth and flexibility of the major curriculum encouraged participation by students and faculty across all divisions of the institution (Taylor & Wyckoff, 2014, p. 2).

The reviewers' analysis of the program's shortcomings focused on its curricular content and structure. First, the reviewers were concerned about the lack of emphasis on a core subset of disciplines: "each field has key insights, skills, and content that every student must understand. We believe that public policy is no different – there are fundamental elements such as ethics, economic opportunity costs, and the nature of the American policy process – that every student should experience" (Taylor & Wyckoff, 2014, p. 3). They argued that the field of public policy is widely understood as rooted in political science, economics, and ethics and pointed out that "[H&WS] is unique [among a list of 14 comparison institutions] in that it does not require *any* of these three elements" (Taylor & Wyckoff, 2014, p. 5) of its public policy majors. Second, because the curriculum lacked required core courses (in any disciplines, much less in these three essential fields), there was no scaffolded structure in which students could acquire and practice skills related to public policy analysis (Taylor & Wyckoff, 2014, p. 3). Finally, the reviewers were concerned about a lack of courses that integrated ethics, economics, and political science in the PPOL curriculum. They wrote,

> *Public policy is an integrated or applied field in which tools from [these] other disciplines are combined, modified, and compared to provide analysis of public sector decisions*. The task of integrating and applying these tools is exciting and enriching – but it is not easy. What is a Rawlsian perspective on the Affordable Care Act? What are the opportunity costs of a federally controlled (versus state or locally controlled) public

> education system? ...These [kinds of] questions require a high order of intellectual skill….The current public policy major requires student[s] to do most of this integrative work on their own. *Without integrative courses to show students how to proceed, there is a great danger that they never do the work, never really study public policy, but rather just take a bunch of unrelated courses.* (Taylor & Wyckoff, 2014, p. 4, emphasis added)

The reviewers made several recommendations. First, the PPOL program should request two new full-time faculty appointments, and at least one of these should involve a person trained in economics since the faculty member occupying the existing line was trained in political science. In addition, the PPOL major should require: the existing introductory level public policy course; courses in political science, economics, and statistics (the latter two to be taught by the faculty hired into the two new lines); and courses in the natural sciences, in ethics, and in critical thinking (offered by current faculty); and a new interdisciplinary capstone course. The reviewers thought that the four-course concentration composed of discipline-based courses could remain, but suggested shorter menus of acceptable electives and greater use of prerequisites.

The reviewers' recommendations paralleled Knight et al.'s (2013) original organizational and curricular criteria for strong interdisciplinary programs. The reviewers thought the program's organizational strength would be improved by increasing the number of lines within PPOL from one to three; they also thought the major's curricular strength would be improved by increasing the number of courses required to complete the major (from 10 to 12) and by increasing the number of courses required to be taken within the interdisciplinary PPOL program (from none to two or more). In effect, the reviewers recommended that PPOL create more of a "guided expedition" experience for its majors, by creating a more structured path (and perhaps a more circumscribed terrain) within the major, and increasing the number of faculty in lines in the program who would help guide students to their destination(s).

However, the reviewers' organizational and curricular recommendations did not reflect an insistence on a "small tent" version of interdisciplinarity, which supports our argument that Knight et al.'s original conceptualization of "strong" interdisciplinary majors as "guided expeditions" is not inconsistent with "big and midsize tent" variants of interdisciplinarity. Although the reviewers' critiques of the existing PPOL major emphasized its lack of structured opportunities for students to explicitly integrate

disciplines, they recommended that just two of 12 required courses be explicitly integrative: the introductory and capstone courses. Many of their remaining recommendations were consistent with Lattuca's (2001) "big tent" description of synthetic interdisciplinarity (which links or bridges two or more disciplines while retaining their distinct contours) or Davies and Devlin's (2010, p. 13) definition of exchange interdisciplinarity ("critique and the critical exchange of views while maintaining robust disciplinary integrity"). For example, they recommended that the revised PPOL curriculum utilize existing disciplinary courses taught by faculty in our philosophy, history, and natural sciences departments.

Finally, the reviewers' critiques and recommendations seemed to indicate their view that the PPOL major should prioritize fostering depth of knowledge rather than breadth. But their comments suggested that they conceptualized interdisciplinary depth of knowledge as including discipline-based content knowledge as well as integrative understanding. The PPOL major was not faulted for failing to provide explicit opportunities to integrate *some* disciplines, but for failing to require courses in – and opportunities to integrate – *particular* disciplines seen as foundational to the field. As they put it, without the requirement of any courses *in* (let alone any courses that *integrate*) economics, political science, and ethics, students wound up taking "a bunch of unrelated courses." The courses were unrelated in two senses: unrelated to each other (because the students had few opportunities to practice disciplinary integration) and unrelated to public policy as a field. Thus, without studying these specific disciplines, students "never really stud[ied] [the interdisciplinary field of] public policy."

Outcome of the External Review

The members of the PPOL steering committee met at the end of 2013-14 and agreed that the major was unsustainable in its current form and that a new curriculum for the major would require at least one new faculty line. We did not reach consensus on whether one new line would be sufficient to staff an improved curriculum, and the administration signaled that PPOL almost certainly would not be granted two position requests in the same round, due in part to budget constraints. We also did not reach consensus on whether we should aim to hire junior- or senior-level faculty into the line(s), should the position request(s) be approved. Finally, some members of the steering committee were conflicted over whether to advocate that the institution give a new tenure line to PPOL if that meant that their home department would not receive a line. After much discussion, we decided to

retain the minor but suspend the major effective for the Fall 2014 entering class. This decision was driven by concerns that the major lacked rigor and/or coherence, coupled with our exhaustion from the strain of administering a popular major without course relief[11] in addition to meeting the service demands of our home departments.

In 2014-15 we began working on proposals for a revised minor as well as major. In spring of 2015, the H&WS faculty voted in a new general curriculum that dropped any distinction between disciplinary and interdisciplinary majors, thus rendering obsolete the requirement that students complete either their major or minor in an interdisciplinary field. This curricular change, coupled with continued budget constraints on staffing and perhaps some level of inertia, contributed to the PPOL major remaining dormant as of this writing.

Lessons Learned: Designing "Strong" Interdisciplinary Majors and Programs

This tale of the rise and fall of an interdisciplinary major can be interpreted through multiple lenses. It can be read as confirming some analysts' concerns about interdisciplinary programs' vulnerability in times of tight budgets, increasing calls for accountability in the form of demonstrated student outcomes, and the continuing disciplinary organization of American higher education (Augsburg, 2006; Henry, 2005). It can be read as confirming others' concerns about the lack of rigor and coherence of interdisciplinary majors as these may be actually, not ideally, configured (Benson, 1982). We see these events through both of these lenses, and through another as well: as confirming that explicit conversations with colleagues about the multiple meanings of interdisciplinarity and the desired educational aims of the major are essential in any process of interdisciplinary curricular and program design (Klein, 2009; Repko, 2007; Stowe & Eder, 2002).

Knight et al. (2013, p. 147), like our external reviewers, asserted that the number of faculty lines in an interdisciplinary program is a key driver of strength: Programs with more dedicated faculty positions will tend to be more organizationally cohesive and will involve less reliance on disciplinary courses in the curriculum. We don't disagree, but it is important to identify effective practices for designing and administering an interdisciplinary

[11] Course releases were only granted for directing a program if there were at least five lines in the program. The level of collective exhaustion was so great that an emeritus faculty member who had formerly served on the PPOL steering committee was recruited to serve as program coordinator during 2013-14.

program even when there are few or no faculty lines dedicated to it. Moreover, pursuing the solution of "more lines" is not cost-free: If the interdisciplinary program does not have at least two full-time faculty already dedicated to it, the considerable work of writing position requests (and hiring for the position and mentoring the new hire through tenure and promotion reviews) will fall to the sole faculty member appointed in the program, or to faculty not appointed in the program who also have service obligations in their home departments. The energies of the faculty affiliated with the PPOL program were so absorbed by the work of administering the existing program that even though we often discussed the importance of submitting one or more position requests to strengthen the program and relieve the administrative burden we shared, we never did so.

And yet, we think that our colleagues' and our efforts to design and administer a robust interdisciplinary major in public policy were hampered less by too few faculty appointments within the program than by our lack of conceptual tools with which to tackle this work. As Stowe and Eder observed, "The mission of an IDS [interdisciplinary studies] program is a local matter that must be defined, not through some absolute reality, but through the process of negotiation and consensus" (2002, p. 79). That process of negotiation and consensus requires a shared vocabulary for the multiple meanings of interdisciplinary education, a common understanding of the range of possible configurations of interdisciplinary programs' aims, organization, and curricula, and shared knowledge of the evidence on whether and when interdisciplinary education has demonstrable impacts on student outcomes. With these tools, we and our PPOL colleagues could have engaged in our curricular discussions with much more clarity of purpose. We would have understood our task to be to align a particular approach to interdisciplinary education and a particular set of educational aims with the major's curriculum, given the organizational resources at hand and the current general curriculum of our institution, and to design assessments of our curriculum that were focused on the particular student outcomes we aimed to foster (see Brooks & Widders, 2012).

If we had engaged in these sorts of discussions following the external review, several different possible scenarios might have unfolded. One possibility is that we and our colleagues might have been persuaded that our program's relational version of interdisciplinarity did a poor job of fostering integrative thinking or depth of understanding. But because at that time our institution required students to complete either a disciplinary major or a disciplinary minor, where presumably students' depth of knowledge was fostered, we might have agreed that our priority could be to foster breadth.

In that case, we might have decided not to pursue a position request, and mainly focused on some judicious editing of our menus of disciplinary electives in the core and concentration courses so as to give our students just a bit more of a "guided expedition" learning experience in the redesigned major.

Once the H&WS faculty voted to drop the requirement that students' major and minor must include both a disciplinary and an interdisciplinary field, we might have chosen to revisit our major's curriculum and discuss whether and how we ought to re-design it to foster depth. Such a conversation likely would have included discussions of how to achieve depth in the context of interdisciplinary education (Davies & Devlin, 2010); whether depth and breadth are still the core aims of 21st century liberal education and best fostered by majors and general education requirements; and whether the new foci of liberal education instead ought to be a set of skills that are best fostered by distinctive pedagogies (Schneider, 2004, 2008).

If, after these discussions, we had reached consensus that we did want to foster depth of understanding of the field of public policy and that our students needed explicit guidance in this journey, we might have been persuaded that the time and energy involved in writing a position request was a worthwhile investment. If we were granted a new line, and if the new hire had training in economics, we could have pursued synthetic interdisciplinarity, focusing on linking or bridging the disciplines of economics and political science while retaining their distinct contours. We could have made one or more existing courses in the economics and political science departments prerequisites for upper-level interdisciplinary courses taught by the new hire. This would be consistent with Davies and Devlin's (2010, pp. 20-22) argument that undergraduates should acquire discipline-based cognitive maps and languages as preparation for interdisciplinary work and Bender's (2013) view that a 21st century liberal education should reverse the traditional sequence of general curriculum requirements followed by disciplinary majors.[12]

If the position request was not granted and we had to figure out how to staff an interdisciplinary major with our existing resources, we might have decided to foster critical thinking and other related skills rather than depth of

[12] These prescriptions dovetail with Holley's (2009a) analysis of a graduate neuroscience program's curriculum: She found that the graduate students and faculty were frustrated with superficial coverage and lack of disciplinary integration in a team-taught first year interdisciplinary course and the wide array of disciplinary electives in second and subsequent years (see also Gardner, Jansujwicz, Hutchins, Cline, & Levesque, 2014).

understanding of the field of public policy studies. In this scenario, we might have pursued exchange interdisciplinarity, which centers on "critique and the critical exchange of views" across different disciplines, "while maintaining robust disciplinary integrity" (Davies & Devlin, 2010, p. 13). Co-taught bi-disciplinary courses are one example of this variant, and our institution has a long history of offering these kinds of courses. We might have decided to require all PPOL majors to take one or more bi-disciplinary courses, and perhaps made it a pre-requisite for a capstone course. Because we were not aiming to foster depth of knowledge about public policy, we might have been fairly sanguine about whether such bi-disciplinary courses had to include either of the "core" disciplines of political science and economics. But we would have had to consider how much disciplinary difference was enough – and how much was too much – to foster undergraduates' critical thinking and other skills (see Lattuca, 2001; Newell, 1994).

Each of these scenarios points to the importance of the local as well as national backdrop of liberal education for designing interdisciplinary majors. In short, we do not think any one particular approach to the design of interdisciplinary majors is necessarily best, and more faculty lines are not the only way to build stronger interdisciplinary programs (see Szostak, 2006). Instead, strong interdisciplinary programs are those in which the faculty clarify the specific curricular aims of the interdisciplinary major in light of the institution's general curriculum, identify which of the various approaches to interdisciplinary education described in the literature will support those aims, and design a sequence and mix of disciplinary and interdisciplinary courses that will make good use of their organizational resources.

In sum, our experience has been that decision-making about interdisciplinary curricular design can be fraught by a lack of consensus – even among faculty who strongly support interdisciplinary education – regarding the meanings of interdisciplinarity and the value of depth and breadth in a 21st century liberal education. Coming to some consensus on these matters requires an investment of time and energy in curricular discussions, which can be "mind-numbingly grinding" (Ferrall, 2011, p. 149). But our experience suggests that so long as interdisciplinary program faculty do not create and maintain their program by engaging in these discussions, and so long as American higher education continues to be organized around disciplinary departments, an interdisciplinary major's curriculum almost certainly will pursue multidisciplinarity, in which the disciplines are merely juxtaposed (Klein, 2009) or co-exist (Davies & Devlin, 2010). We believe that multidisciplinarity can be valuable for

fostering breadth of knowledge, but we think faculty and students are better served when this choice is made deliberately, after full consideration of other approaches to interdisciplinary education. Developing a shared vocabulary about the varieties of interdisciplinary education is an essential first step towards productive discussions and decision-making about the design and assessment of interdisciplinary major curricula.

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Biographical Notes: Renee A. Monson is an associate professor in the Sociology Department at Hobart and William Smith Colleges. Her research on welfare reform, child support enforcement policy, presidential elections, and collaborative pedagogy has appeared in several journals and edited volumes. She teaches courses in research methods, gender, family, social policy, and reproductive politics. She can be contacted at monson@hws.edu.

Kristy L. Kenyon is a professor in the Biology Department at Hobart and William Smith Colleges. Her scholarly work is focused across the fields of developmental biology, neuroscience and STEM education. She teaches courses in genetics, developmental biology, stem cell biology, and reproductive politics. She can be contacted at kenyon@hws.edu.

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